

CLAIMS

1) A method intended for real-time estimation of the flow mode, at all points of a pipe whose structure can be defined by a certain number of structure parameters, of a multiphase fluid stream defined by several physical quantities and comprising at least a liquid phase and at least a gas phase, characterized in that it comprises :

- forming a non-linear neural network with an input layer having as many inputs as there are structure parameters and physical quantities, an output layer with as many outputs as there are quantities necessary for estimation of the flow mode and at least one intermediate layer,
- creating a learning base with predetermined tables connecting various values obtained for the output data to the corresponding values of the input data, and
- determining by iterations weighting factors of the activation function allowing to properly connect the values in the input and output data tables.

2) A method as claimed in claim 1, further comprising analysing the output data of the neural network so as to allow to sort, among the values of the output data of the neural network, only the pertinent data to be taken into account in the iterative determination of the weighting coefficients of the activation function.

3) A method as claimed in claim 1 or 2, characterized in that a totally connected network is formed.

4) A method as claimed in any one of claims 1 to 3, characterized in that the output neurons are linear.

5) A method as claimed in any one of claims 1 to 3, characterized in that the activation function is an identity function.

6) A system intended for real-time estimation of the flow mode, at all points of a pipe whose structure can be defined by a certain number of structure parameters, of a multiphase fluid stream defined by several physical quantities and comprising at least a liquid phase and at least a gas phase, characterized in that it comprises :

- means for determining characteristics of a non-linear neural network with an input layer having as many inputs as there are structure parameters and physical quantities, an output layer having as many outputs as there are quantities necessary for estimation of the flow mode and at least one intermediate layer,
- means for storing a learning base with predetermined tables connecting various values obtained for the output data to the corresponding values of the input data, and
- means for determining by iterations weighting factors of an activation function allowing to properly connect the values in the input and output data tables.

7) A system as claimed in claim 6, comprising means for analysing the output data of the neural network allowing to sort, among the values of the output data of the neural network, only the pertinent data to be taken into account in the iterative determination of the weighting coefficients of the activation function.